



# DNS network for .RU,.SU,.PФ

Elena Voronina



# DNS Network:



## RIPNDNS Network:

DNS network - a distributed network of DNS nodes located in 7 federal districts of the Russian Federation, in Europe, Asia and North America. Multiple redundancy at the hardware and network layers, optimum connectivity of RIPNDNS nodes with the Russian and foreign ISPs and 24x7 technical support enable fault-tolerant DNS service with a minimum response time and 100% service availability.

Technical support of ccTLD projects

For .SU domains since 1993

For .RU domains since 1995

For .PФ domains since 2010

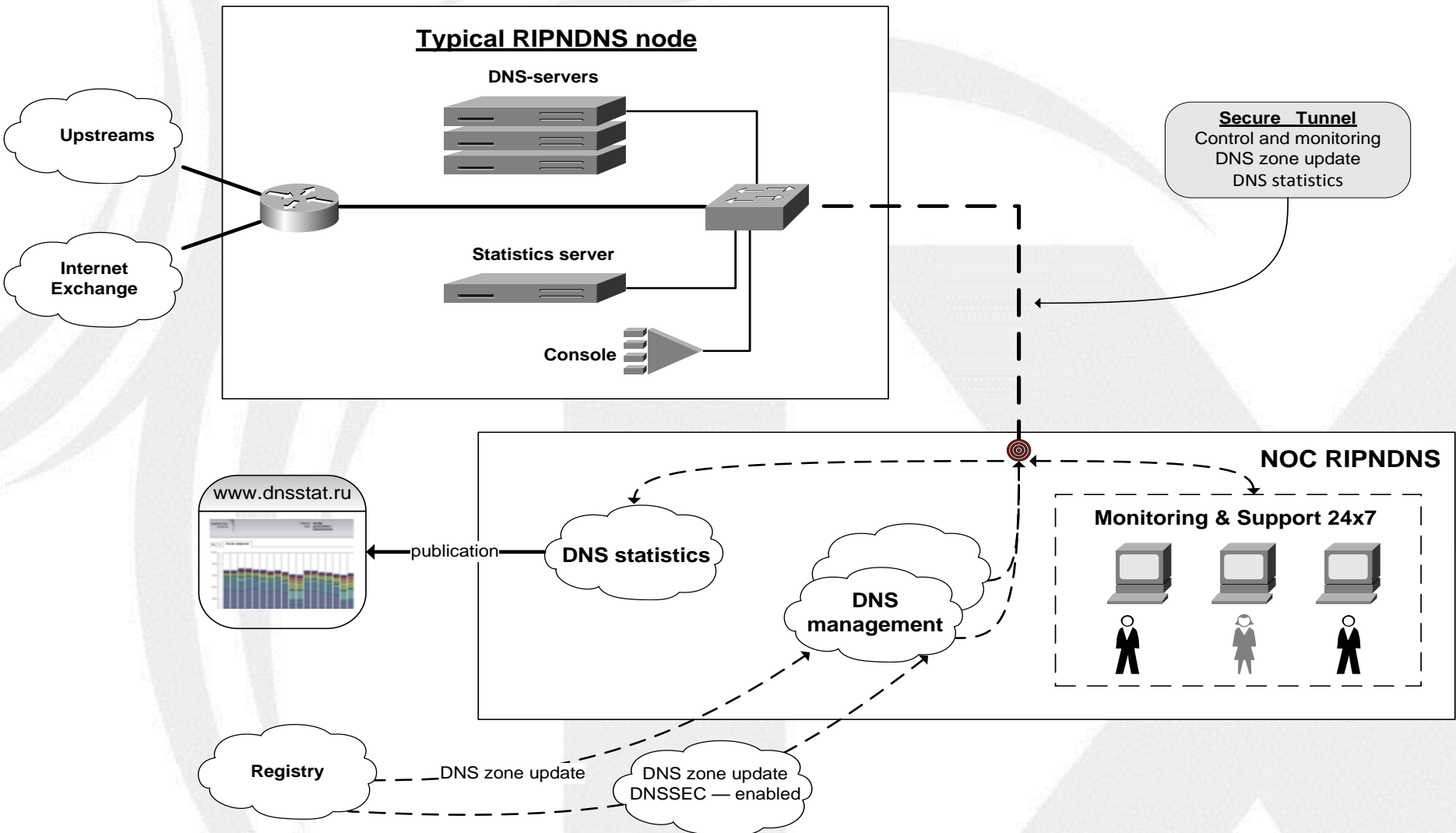
# RIPNDNS Distributed Network Topology

RIPNDNS network hosts 15 DNS nodes located in 7 federal districts of the Russian Federation, in Europe, Asia and North America



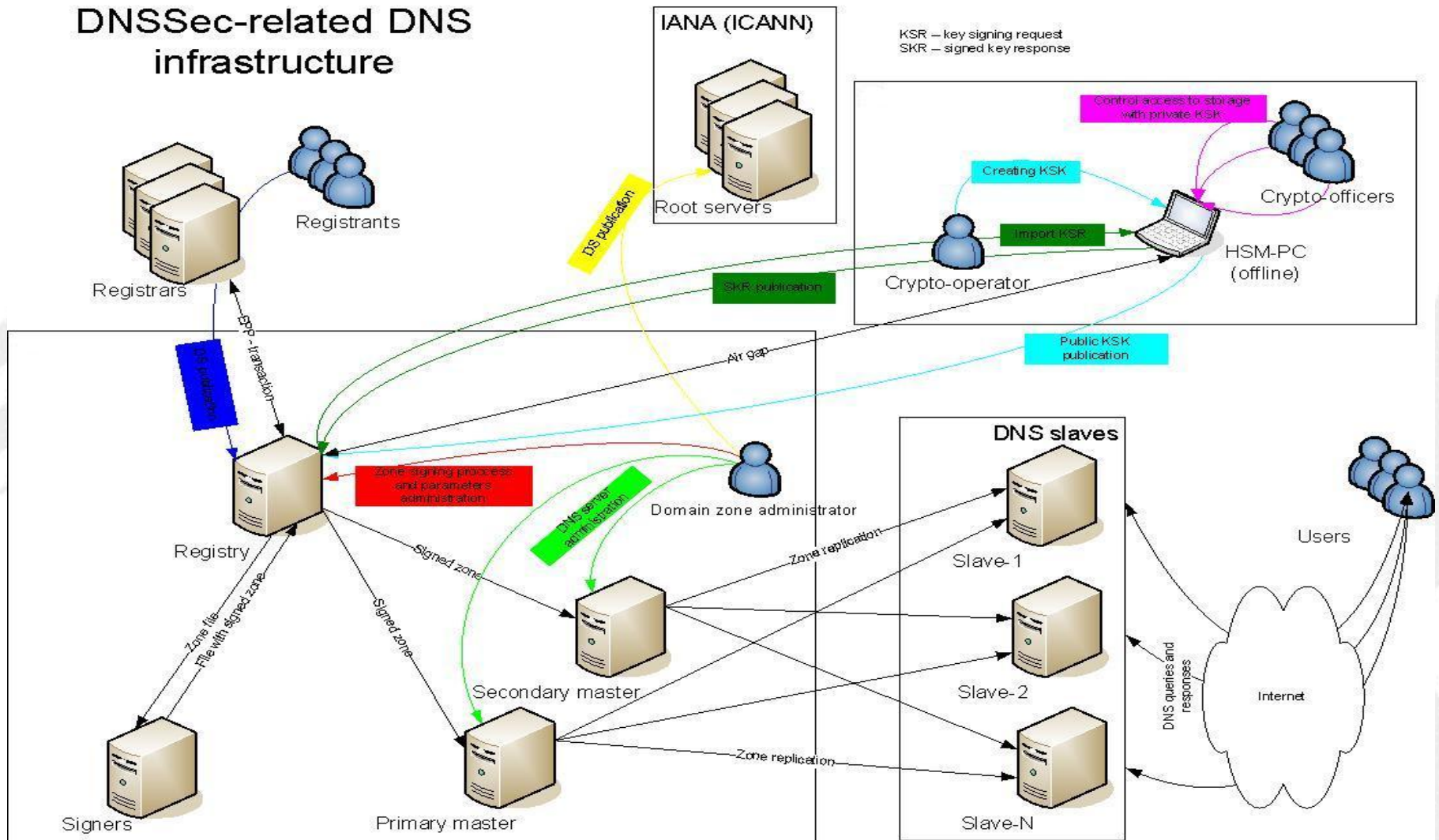
All RIPNDNS nodes are connected to upstreams and Internet Exchanges

# RIPNDNS Architecture



# DNSSEC-related DNS infrastructure

## DNSSEC-related DNS infrastructure







# RIPNDNS Nodes equipment



## Hardware in use

- Intel® Xeon® 5504 series processor or better;
- RAM 4 GB, expandable;
- 5 SATA 2 x RAID10 configuration hot-swappable hard discs;
- Two redundant PSUs.

## Software in use

All servers operate under FreeBSD OS, the service is rendered using the BIND software with optimal settings, as follows:

- Disabled recursion;
- Disabled additional-from-cache option;
- Disabled notifications (only for secondary name servers).

In addition to BIND, the NSD software is installed on the standby server. This enables a roll-out of another DNS system within 24 hours.

## Network equipment

Cisco 72xx series is applied as router, Cisco 35xx or 37xx series – as switch.



# Compliance with RFC



RFC 5966: All the authoritative servers support the function via TCP; the network equipment is adjusted to the full-fledged support of DNS functioning via TCP.

RFC 3901, 4472: Authoritative servers support both IPv4 and IPv6 addressing and use RFC recommendations to avoid DNS address space and hierarchy defragmentation.

RFC 2182: The DNS servers are geographically distributed. They are located in different hosting facilities and connected to different providers. The location policy provides for installing the DNS servers in maximum possible immediate proximity to end-users. This conforms with RFC 2182.

RFC 2671, 3226: The DNS servers and network equipment support the size of query/response up to 4096 bit.

RFC 4033,4034,4035,5155: The DNSSEC.

All other RFCs: Employment of the DNS server reference implementation (BIND) as the master platform and use of NSD as the standby one allows asserting the requirements set forth in these RFC are complied with.



# Access Statistics

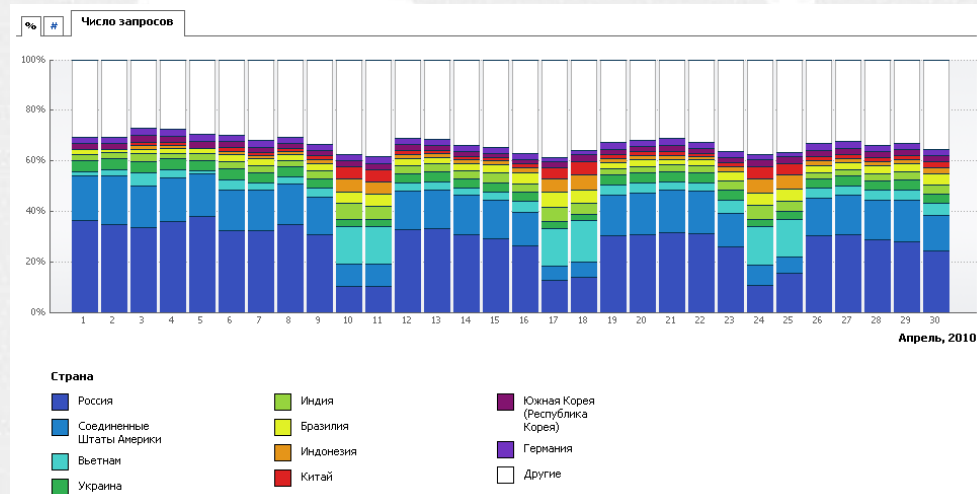
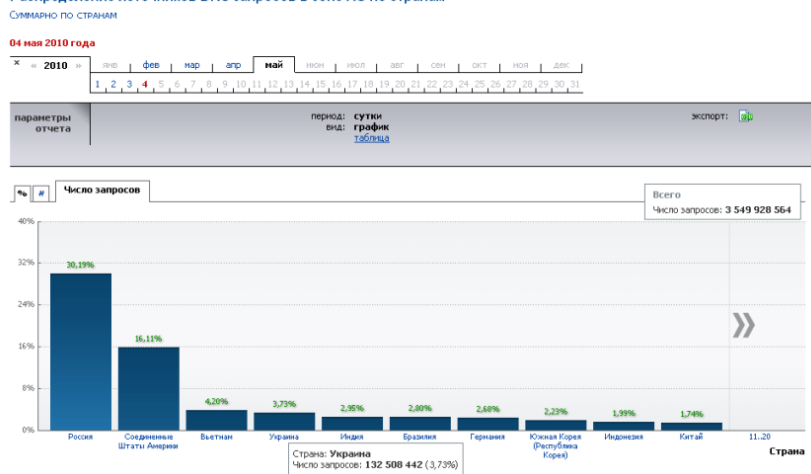


RIPNDNS node's statistics server collects statistics of requests sent by the local caching DNS servers to the RIPNDNS servers of the node.

Statistics is aggregated and sent to the central statistics server to make daily reports:

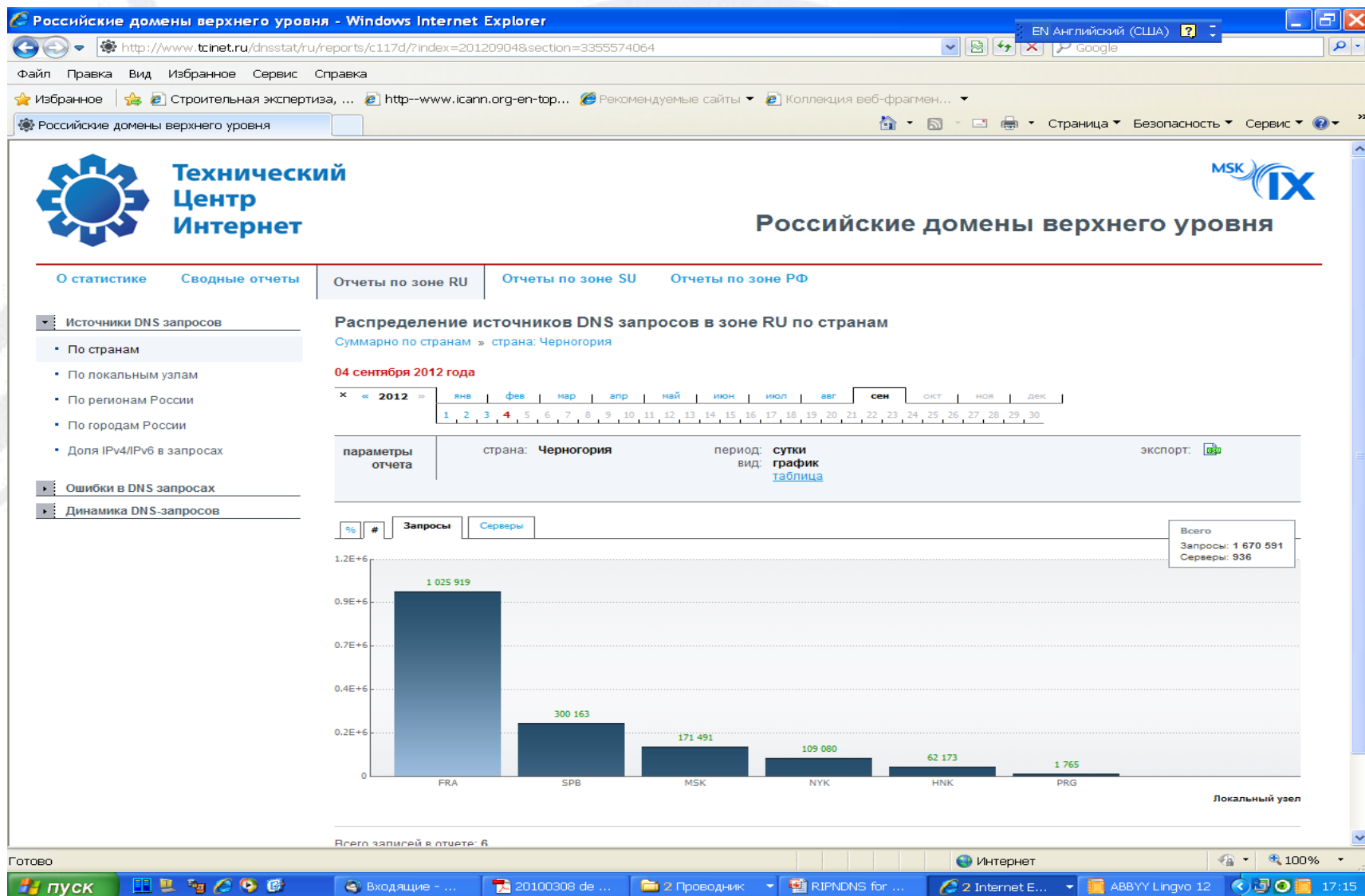
- aggregate request statistics
- geographical access distribution (for each RIPNDNS node)
- access failure analysis

Распределение источников DNS запросов в зоне RU по странам

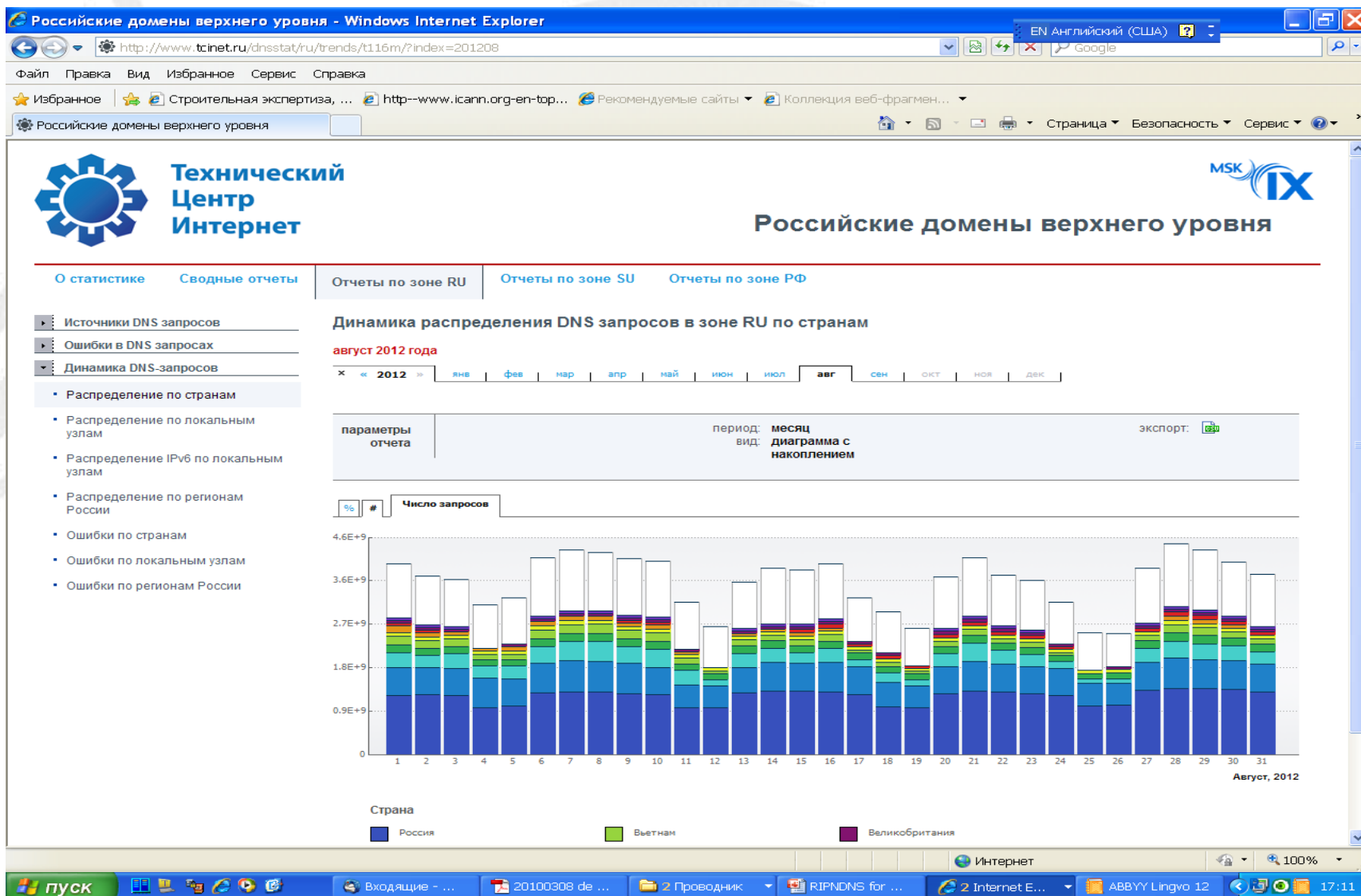




# Access Statistics



# Access Statistics



# Typical RIPNDNS Node





## Service accessibility levels

DNS service availability - 100%

DNS name server availability – 99,99%

UDP local resolution RTT =<5 ms

TCP local resolution RTT =<5 ms

UDP remote resolution RTT =<300 ms for at least 95% of the queries

TCP remote resolution RTT =<500 ms for at least 95% of the queries

DNS update time =< 60 min

Server changeover time, once one of two node servers fails – 30 sec

In addition to BIND, the NSD software is installed on the standby server. This enables a roll-out of another DNS system within 24 hours.



## Robustness and Fault-Tolerance of RIPNDNS

- DNS nodes in 7 federal districts of the Russia, in Europe, Asia and North America
- Protection from network failures and attacks by multiple redundancy of DNS nodes and communications channels
- Optimum connectivity with Russian and foreign ISP networks, presence at the popular Internet Exchanges
- High performance of DNS node servers and network hardware
- Using open source DNS Server implementation, BIND (Berkeley Internet Name Domain)
- High performance, DNS response within 5 ms
- Guaranteed service availability of 100%
- 24x7 technical support and monitoring





Question...

